

WHAT IS CLAIMED IS:

1. A thin film forming method, comprising the steps of:

employing a surface of a substrate as one electrode and disposing the surface of the substrate in a distance d (cm) apart from another electrode in a discharge space in which there are positioned at least a pair of electrodes connected to an RF power source;

introducing a gas containing one or more silicon compounds and hydrogen into the discharge space;

setting the product Pd of a film forming pressure P (Pa) and d and hydrogen flow rate M (SLM) so as to meet the relation:

$80M + 200 \leq Pd \leq 160M + 333$; and

applying RF power to generate a plasma and to form a non-monocrystal silicon thin film on the substrate in the discharge space.

2. The thin film forming method as set forth in Claim 1, wherein said product Pd and flow rate L (SLM) of a gas mixture comprising said gas containing one or more silicon compounds and hydrogen are set so as to meet the relation:

$67L + 200 \leq Pd \leq 147L + 333$.

3. The thin film forming method as set forth in Claim 1, wherein said distance d lies in a range of 0.5

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to 3 cm.

4. The thin film forming method as set forth in
Claim 1, wherein said hydrogen flow rate M ranges from
5 500 sccm to 10000 sccm.

5. The thin film forming method as set forth in
Claim 1, wherein a flow rate of said gas containing one
or more of said silicon compounds ranges from 10 sccm
10 to 1000 sccm.

6. A thin film forming method, comprising the
steps of:

15 employing a surface of a substrate as one
electrode and disposing the surface of the substrate in
a distance d (cm) apart from another electrode in a
discharge space in which there are positioned at least
a pair of electrodes connected to an RF power source;

20 introducing a gas containing one or more silicon
compounds and hydrogen into the discharge space;

setting the product Pd of a film forming pressure
P (Pa) and d and the ratio M/V of hydrogen flow rate M
(SLM) to volume V (cm³) of the discharge space so as to
meet the relation:

25 $4 \times 10^5 \text{ dM/V} + 200 \leq \text{Pd} \leq 8 \times 10^5 \text{ dM/V} + 333$; and

applying RF power to generate a plasma and to form
a non-monocrystal silicon thin film on the substrate in

the discharge space.

7. The thin film forming method as set forth in
Claim 6, wherein said product Pd and flow rate L (SLM)
5 of a gas mixture comprising said gas containing one or
more silicon compounds and hydrogen divided by said
volume V (cm^3) are set so as to meet the relation:

$$3.3 \times 10^5 \frac{\text{dL}}{\text{V}} + 200 \leq \text{Pd} \leq 7.3 \times 10^5 \frac{\text{dL}}{\text{V}} + 333.$$

10 8. The thin film forming method as set forth in
Claim 6, wherein said distance d lies in a range of 0.5
to 3 cm.

15 9. The thin film forming method as set forth in
Claim 6, wherein said hydrogen flow rate M ranges from
500 sccm to 10000 sccm.

10. The thin film forming method as set forth in
Claim 6, wherein a flow rate of said gas containing one
20 or more of said silicon compounds ranges from 10 sccm
to 1000 sccm.

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